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Ziegler et al.

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(54) **AUTHENTICATION AND AUTHORIZATION FOR ACCESS TO SOFT AND HARD ASSETS**

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H04W 12/06 (2021.01)

(52) **U.S. Cl.**
CPC ***H04W 12/06*** (2013.01)

(58) **Field of Classification Search**
CPC .. H04W 12/06; H04W 12/084; H04L 63/0492
See application file for complete search history.

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(57) **ABSTRACT**

A System Platform establishes a Genuine User ID ("GUID"), creates a user profile for an Intended User, generates a unique data set based upon input associated with the user profile and a digital device it has registered to the Intended User. The output of the GUID in combination with the output of an algorithm in a provisioning application enables the digital device to respond to Access Requests at an Access Point. The response from the genuine Intended User's application on their genuine digital device produces a unique data package which combines the GUID, a device ID for the digital device and the output of the algorithm using the payload obtained from one or more data management sources. The unique data package can be tailored for many different uses by the intended user, including uses which are attended or unattended, with varying levels of security.

6 Claims, 10 Drawing Sheets

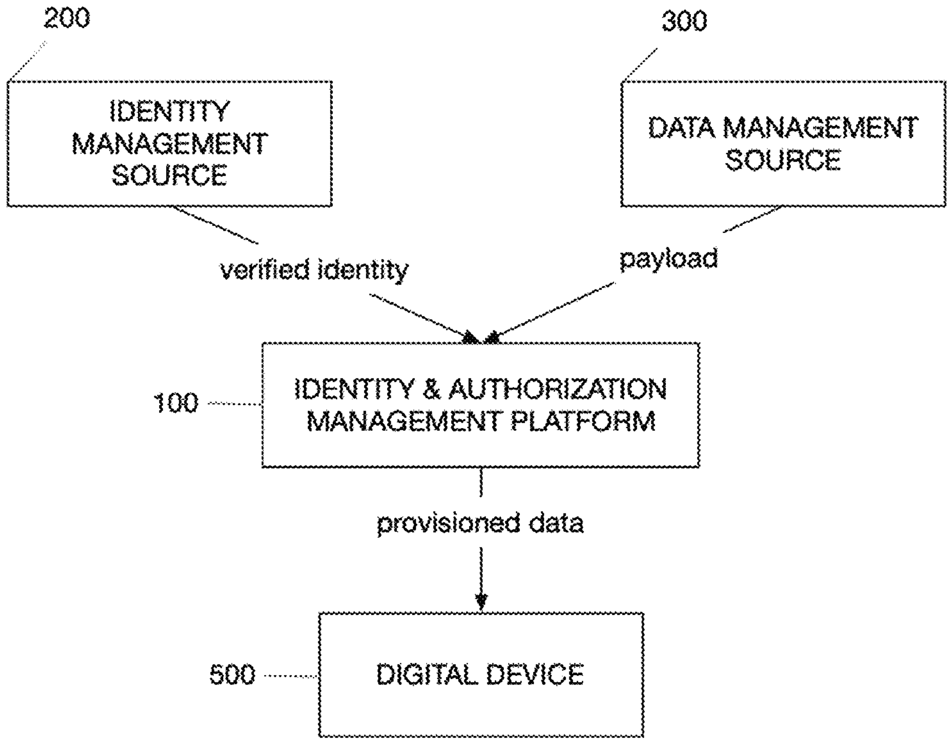


FIG. 1

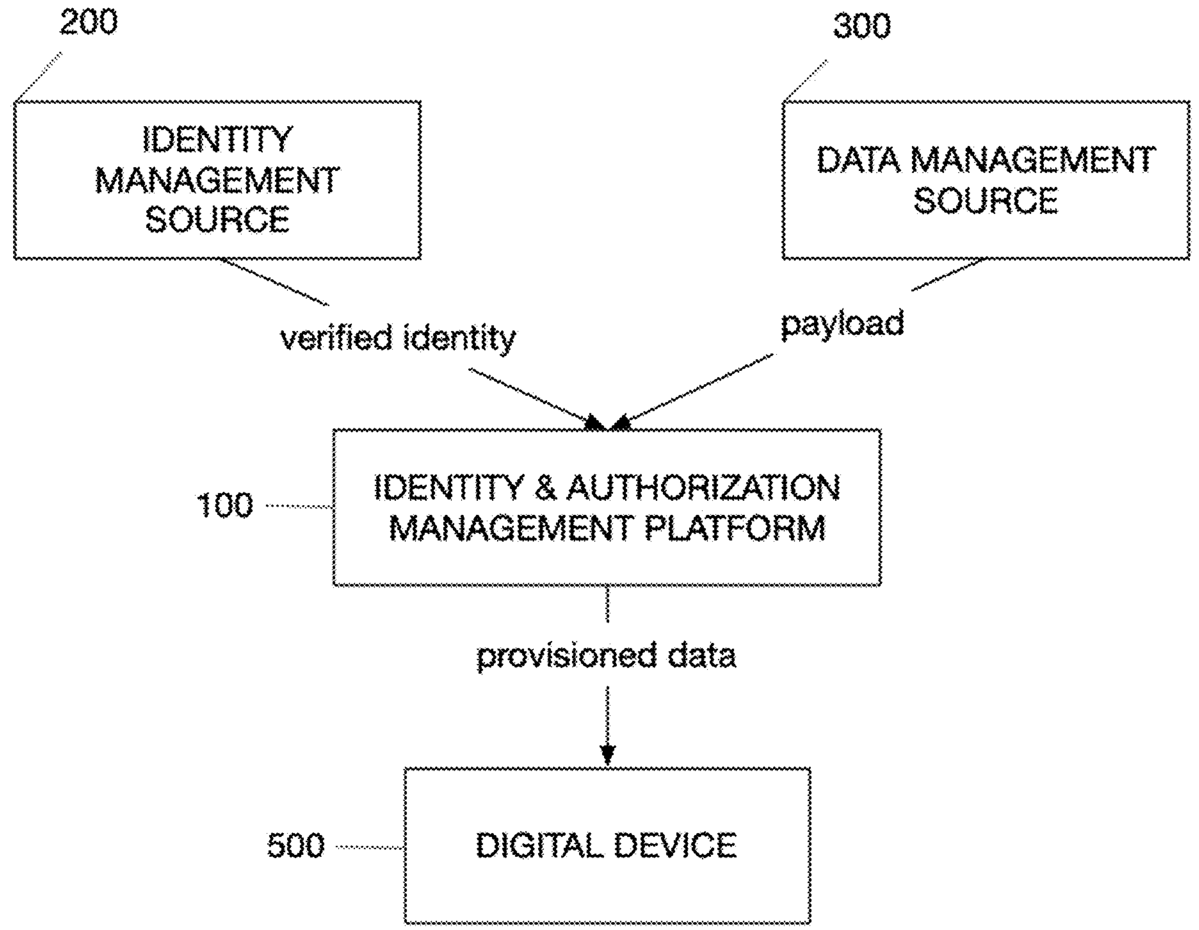

200
IDENTITY MANAGEMENT SOURCE
300
DATA MANAGEMENT SOURCE
verified identity
payload
100
IDENTITY & AUTHORIZATION MANAGEMENT PLATFORM
provisioned data
500
DIGITAL DEVICE

FIG. 2

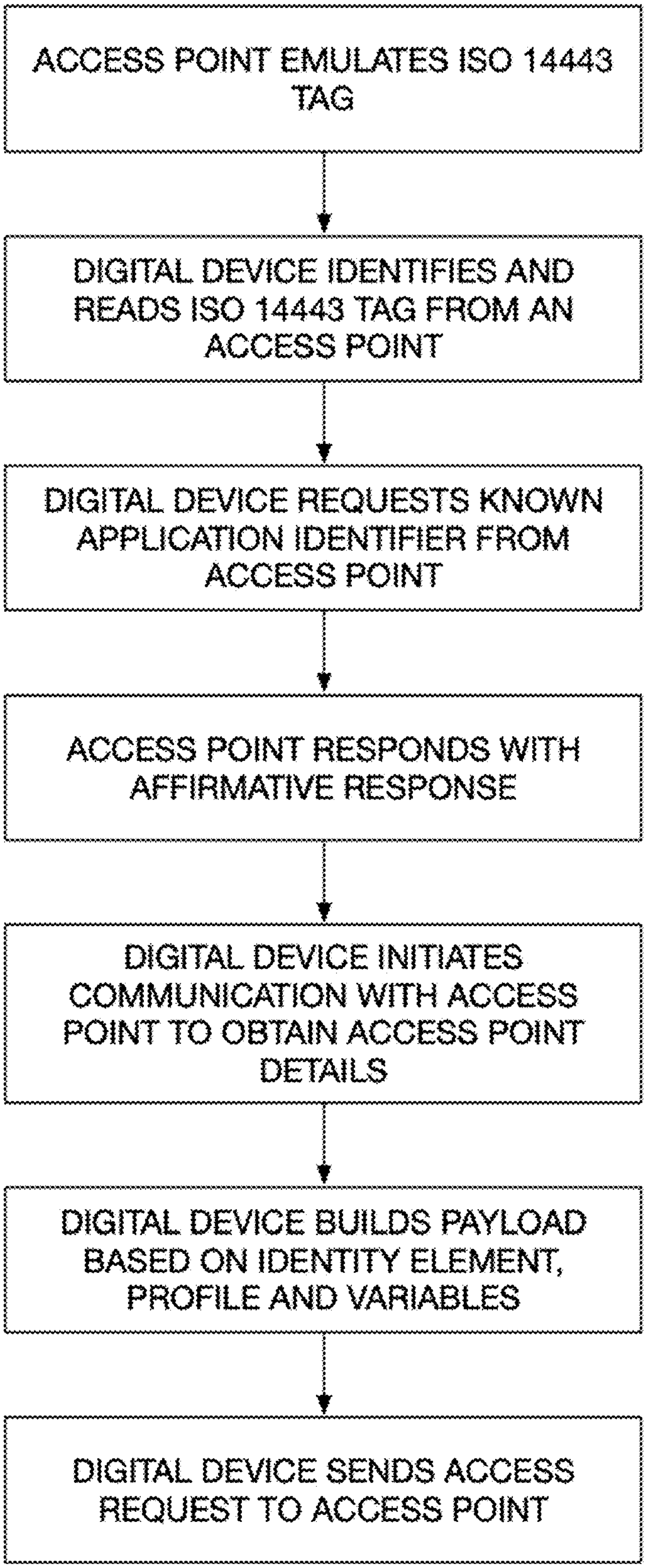

ACCESS POINT EMULATES ISO 14443 TAG
DIGITAL DEVICE IDENTIFIES AND READS ISO 14443 TAG FROM AN ACCESS POINT
DIGITAL DEVICE REQUESTS KNOWN APPLICATION IDENTIFIER FROM ACCESS POINT
ACCESS POINT RESPONDS WITH AFFIRMATIVE RESPONSE
DIGITAL DEVICE INITIATES COMMUNICATION WITH ACCESS POINT TO OBTAIN ACCESS POINT DETAILS
DIGITAL DEVICE BUILDS PAYLOAD BASED ON IDENTITY ELEMENT, PROFILE AND VARIABLES
DIGITAL DEVICE SENDS ACCESS REQUEST TO ACCESS POINT

FIG. 3

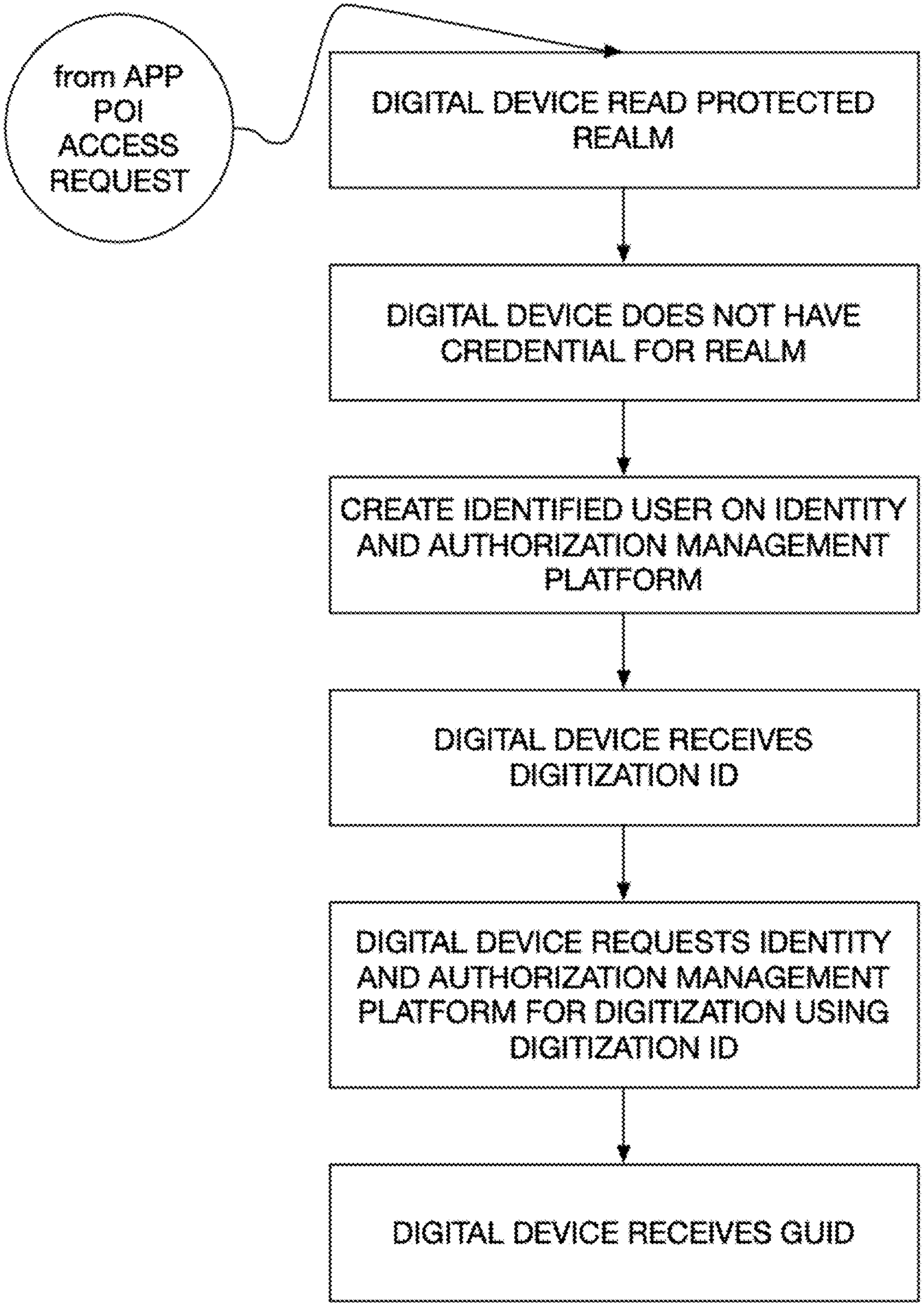

from APP POI ACCESS REQUEST
DIGITAL DEVICE READ PROTECTED REALM
DIGITAL DEVICE DOES NOT HAVE CREDENTIAL FOR REALM
CREATE IDENTIFIED USER ON IDENTITY AND AUTHORIZATION MANAGEMENT PLATFORM
DIGITAL DEVICE RECEIVES DIGITIZATION ID
DIGITAL DEVICE REQUESTS IDENTITY AND AUTHORIZATION MANAGEMENT PLATFORM FOR DIGITIZATION USING DIGITIZATION ID
DIGITAL DEVICE RECEIVES GUID

FIG. 4

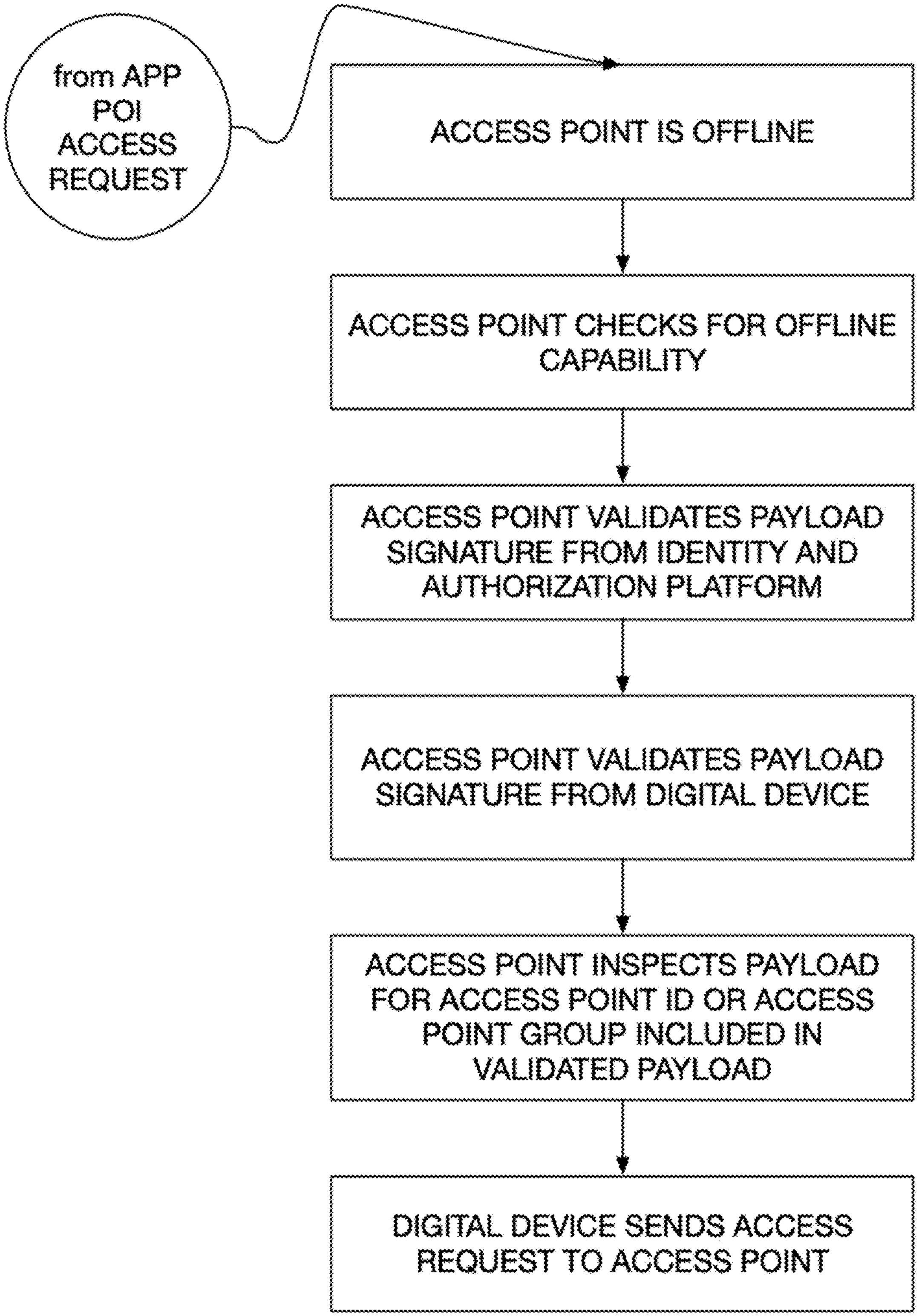

from APP
POI
ACCESS
REQUEST
ACCESS POINT IS OFFLINE
ACCESS POINT CHECKS FOR OFFLINE CAPABILITY
ACCESS POINT VALIDATES PAYLOAD SIGNATURE FROM IDENTITY AND AUTHORIZATION PLATFORM
ACCESS POINT VALIDATES PAYLOAD SIGNATURE FROM DIGITAL DEVICE
ACCESS POINT INSPECTS PAYLOAD FOR ACCESS POINT ID OR ACCESS POINT GROUP INCLUDED IN VALIDATED PAYLOAD
DIGITAL DEVICE SENDS ACCESS REQUEST TO ACCESS POINT

FIG. 5

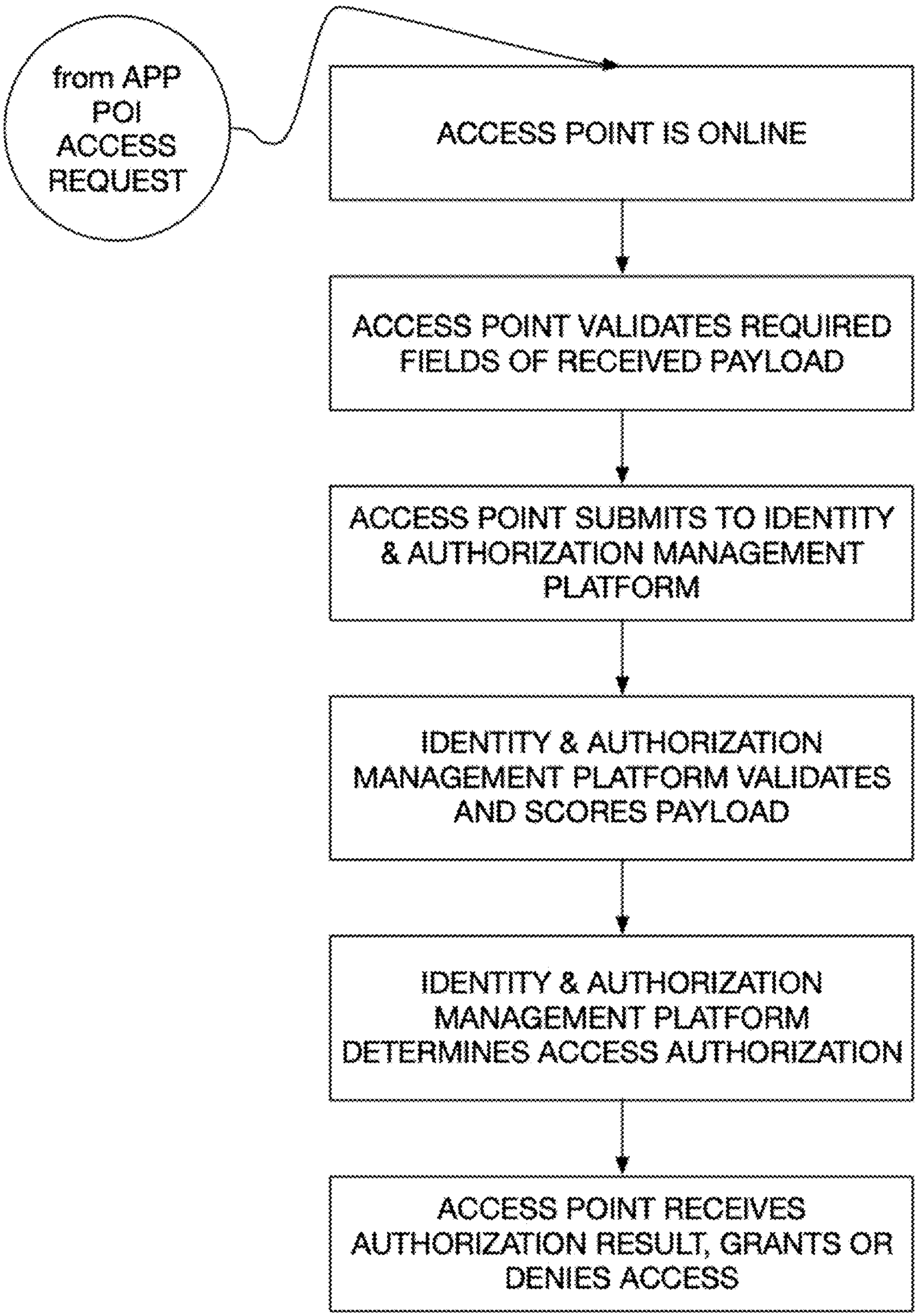

from APP POI ACCESS REQUEST
ACCESS POINT IS ONLINE
ACCESS POINT VALIDATES REQUIRED FIELDS OF RECEIVED PAYLOAD
ACCESS POINT SUBMITS TO IDENTITY & AUTHORIZATION MANAGEMENT PLATFORM
IDENTITY & AUTHORIZATION MANAGEMENT PLATFORM VALIDATES AND SCORES PAYLOAD
IDENTITY & AUTHORIZATION MANAGEMENT PLATFORM DETERMINES ACCESS AUTHORIZATION
ACCESS POINT RECEIVES AUTHORIZATION RESULT, GRANTS OR DENIES ACCESS

FIG. 6

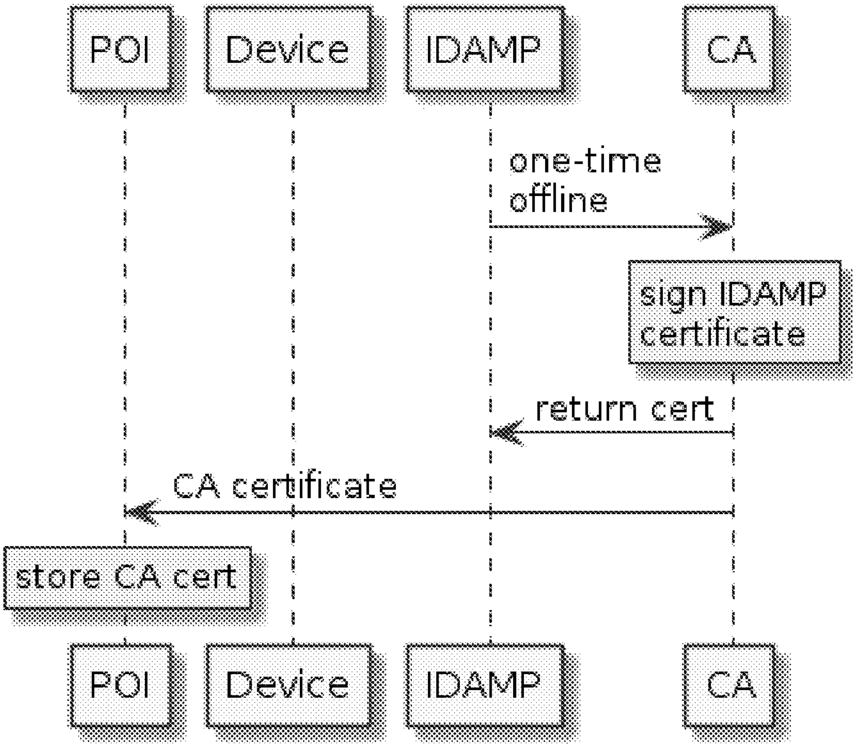

POI
Device
IDAMP
CA
one-time
offline
sign IDAMP
certificate
return cert
CA certificate
store CA cert
POI
Device
IDAMP
CA

FIG. 7

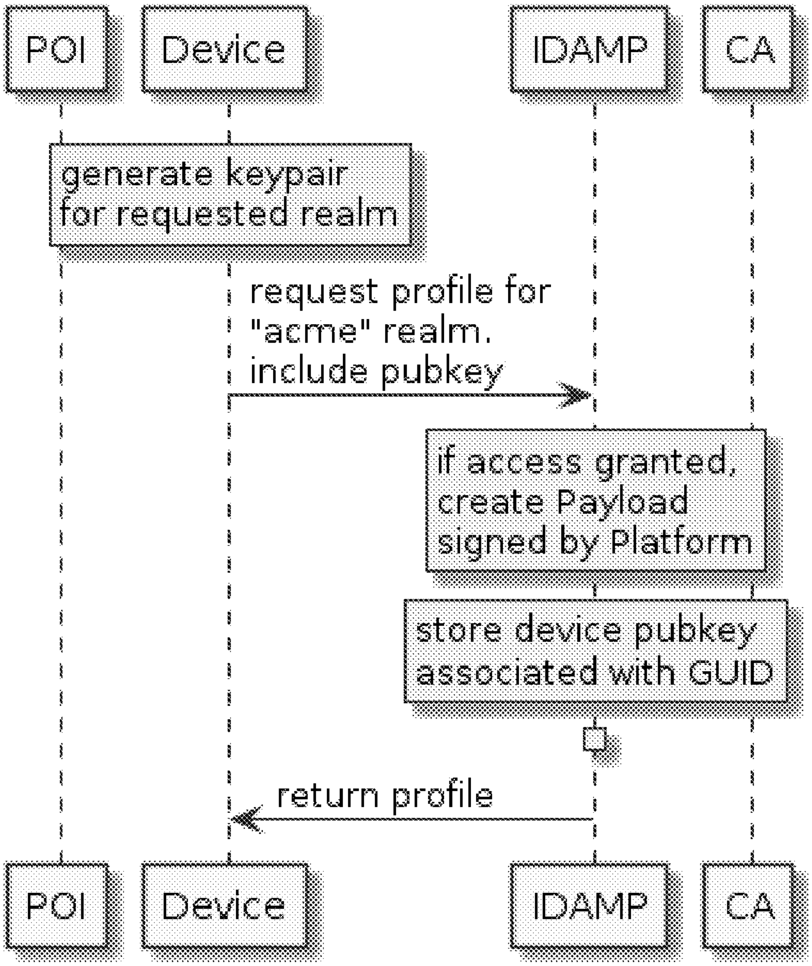

POI
Device
IDAMP
CA
generate keypair
for requested realm
request profile for
"acme" realm.
include pubkey
if access granted,
create Payload
signed by Platform
store device pubkey
associated with GUID
return profile
POI
Device
IDAMP
CA

FIG. 8

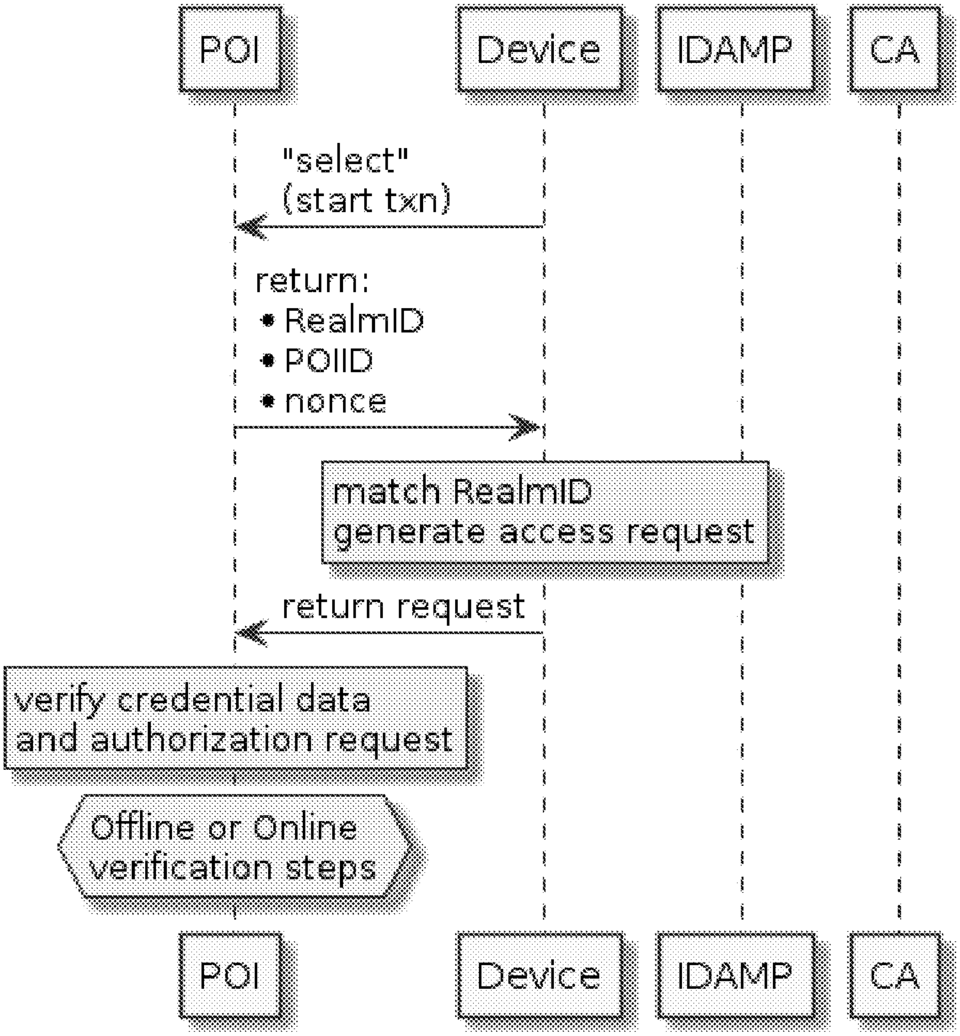

POI
Device
IDAMP
CA
"select"
(start txn)
return:
• RealmID
• POIID
• nonce
match RealmID
generate access request
return request
verify credential data
and authorization request
Offline or Online
verification steps
POI
Device
IDAMP
CA

FIG. 9

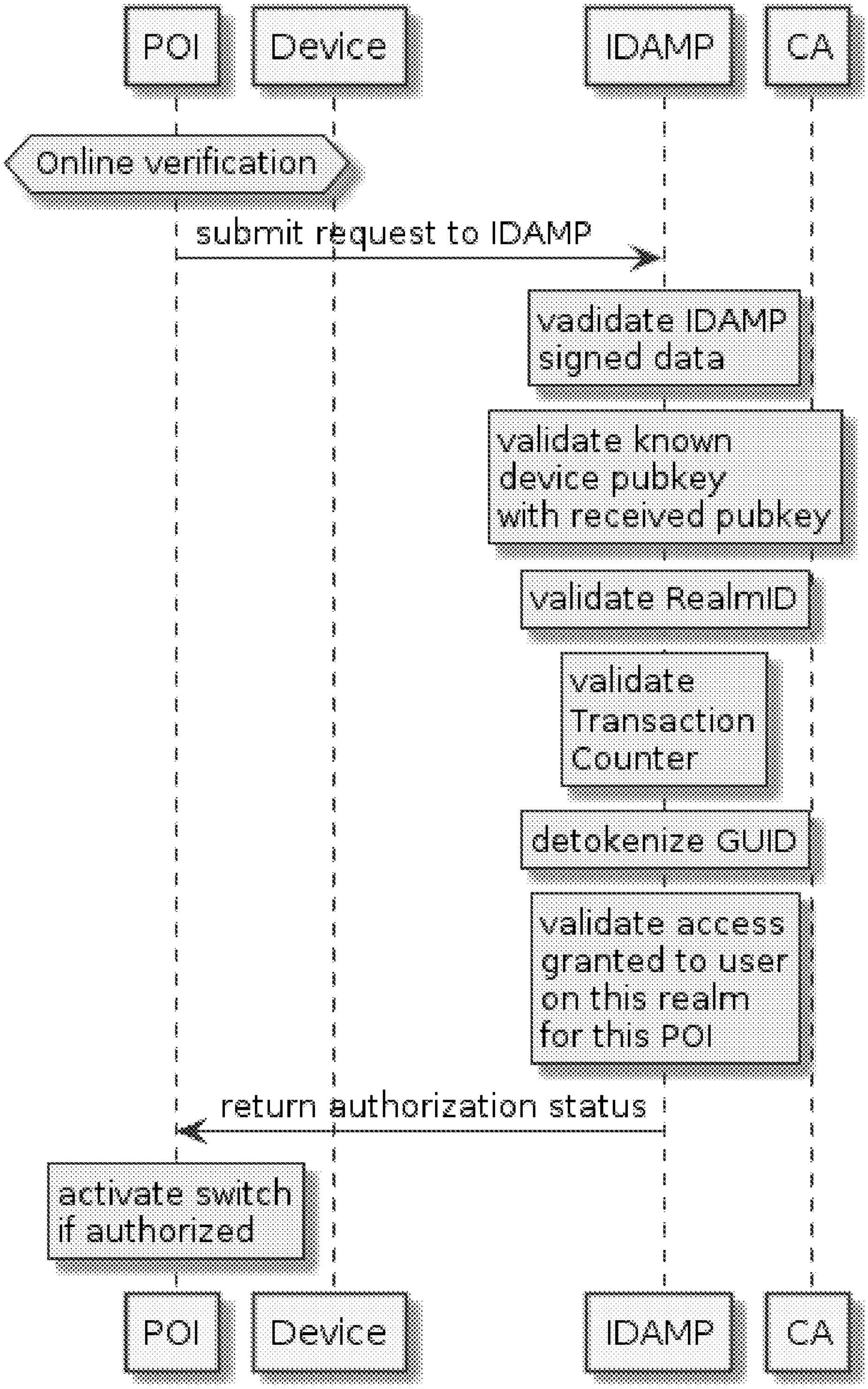
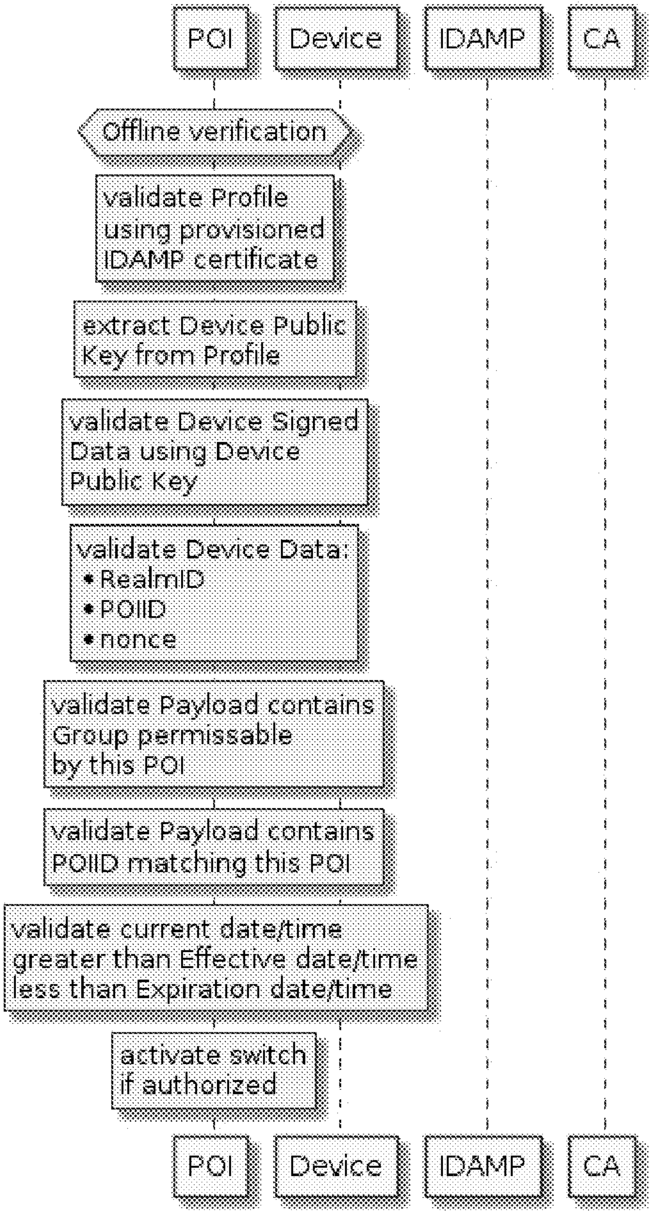

POI
Device
IDAMP
CA
Online verification
submit request to IDAMP
vadidate IDAMP signed data
validate known device pubkey with received pubkey
validate RealmID
validate Transaction Counter
detokenize GUID
validate access granted to user on this realm for this POI
return authorization status
activate switch if authorized
POI
Device
IDAMP
CA

FIG. 10


POI
Device
IDAMP
CA
Offline verification
validate Profile using provisioned IDAMP certificate
extract Device Public Key from Profile
validate Device Signed Data using Device Public Key
validate Device Data:
• RealmID
• POIID
• nonce
validate Payload contains Group permissable by this POI
validate Payload contains POIID matching this POI
validate current date/time greater than Effective date/time less than Expiration date/time
activate switch if authorized
POI
Device
IDAMP
CA

AUTHENTICATION AND AUTHORIZATION FOR ACCESS TO SOFT AND HARD ASSETS

Cross Reference to Related Applications

This application is a non-provisional application which claims priority from U.S. Ser. No. 63/047,922, filed Jul. 3, 2021, the disclosure of which is specifically incorporated herein by reference in its entirety.

FIELD OF THE INVENTION

The present invention is in the field of identification of an individual and authentication of digital data associated with that individual or digital data associated with a Controlling Party to provide digital access to both hard assets, such as, but not limited to, more secure areas within a property, campus, building, and access to soft assets, such as highly confidential files or medical files, which require privacy. The present invention enables the User, defined as the Genuine User or a Controlling Party to control their own personal or Controlling Party data to grant access to their physical hard assets and to control their associated digital information.

BACKGROUND OF THE INVENTION

Today access to hard assets is provided by physical metal keys, contactless card keys for door access, electronic keys (like Fast Track™ to pay tolls) or a card or mobile device to access subways. Access to electronic data is primarily provided by passwords, two factor authentication. Access can be made more secure by access controls in combination with biometric data, such as facial recognition, fingerprints, optical scan, voice recognition, to name a few.

Each of these means of access control have advantages and disadvantages, depending on the use. Some access control devices require a high level of assurance that the individual and the device are authentic, like making an electronic payment, whereas other access control devices do not require the individual's identity and the user remains anonymous such as access to a subway or bus. In addition, other access controls used for high security areas in government or private industry require absolute authentication of the individual. Some require high speed access based on the volume of throughput such as payments, while others are less time sensitive and require additional steps to authenticate the individual. Access to public transportation requires speedy processing time where millions of people use the subway system in Tokyo or New York City. Conversely, access to secure areas of a military base or access to highly secure documents in companies or government, put a heavier emphasis on authenticating the individual being given access.

The weaknesses of metal keys and access control card keys are that they are easily compromised. If even momentarily they fall into the wrong hands, a nefarious individual can make a copy of the key to gain access.

The points of access to physical hard assets and/or soft digital soft assets that relies on passwords has exposed many ways that a password can be compromised from writing the password or digital theft through "man in the middle" attacks like keyboard sniffers or cameras exposing the key entry. Two factor authentication has provided greater security but remains susceptible to "man-in-the-middle" attacks. Depending on the value of the access being protected, fraudsters and hackers have found several ways to compromise these systems.

SUMMARY OF THE INVENTION

The present invention is generally directed to a method for the User (Genuine User or Controlling Party) to establish and associate two inputs to provide digital access to either hard assets, like a building, venue, property etc., or soft assets, like digital files, or to enable the User to provide another entity to gain access to his/her or their Digital Data Records.

The first input is an Identify Management Source to establish a Genuine User ID ("GUID") that represents the Intended User of the system. The second input is a connection to a Data Management Source or several Data Management Sources to associate a Digital Data Record (the Payload) that is owned or controlled by the User. These two inputs are instantiated/established on a Software Platform to enable access.

The GUID must be established with a high level of assurance to ensure the Intended User is who he/she purports themselves to be, which means that the Intended User is in fact the Genuine User for whom the GUID is established. The GUID is essential to enable repudiation whenever the User associates Digital Data Records to gain access to either hard assets or soft assets or when the Access Point is entitled to receive an Identity Element ("IE") or the Payload. THE GUID ensures the Genuine Identity while preserving privacy. The GUID may be comprised of one or more IE. IE may include, but are not limited to name, address, government ID number, age, sex, birthdate, vaccines, or any other Personally Identifiable Information (PII). Each IE may be held in the digital equivalent of separate Safety Deposit Boxes. Only the GUID enables a User to share one or more IE.

The second input is obtained from a Data Management Source which establishes genuine Digital Data Record(s) (the Payload) under the control of the User. The User selects which of his/her or their IE or User's Payload may be associated with the GUID and provided to a Control Point. The User may control digital assets like, but not limited to, health records, vaccine record, financial record(s), security clearance certificate, educational record, military record, business records, PII data over the Internet, to name a few. The User of the GUID may associate IE at a Control Point.

Any Payload or IE may have a limited term of use based on Rules and Permissions set when establishing the GUID or Payload on the Transaction Platform. The User, whether it is the Genuine User or a Controlling Party, controls the Rules and Permissions associated with their IE or Payload.

Once established, the Rules and Permissions associated with the IE inputs, the GUID and the Payload inputs enable access at a Control Point. The access can preserve the Intended User's privacy or reveal PII.

The appropriate IE or Payload will be useful to grant access to:

A concert or festival venue; workplace; military base; an automobile, transportation such as plane, train, bus, subway etc. Each may require additional levels of assurance by other means, such as one or more of the Identity elements (e.g., Date of Birth, Sex, Photo, biometric verification, and other means described below).

Digital (aka soft) assets include, but are not limited to, electronic health records, educational records, professional certifications, company, military, or government files, or other Digital Data Records, e.g., vaccine records, antibody test certificate. These digital assets will be associated with Rules and Permissions and a term for use. Each may require additional levels of assurance by other means as described herein.

In addition, the User may enable another entity access to some or all of the User's GUID Identity Elements or Payload Digital records controlled by the User. Examples. The User may grant a Payload of the User's Electronic Health Record to a new physician, or for a telemedicine visit or a medical tourism procedure. Alternatively, that same User may grant information for analysis, granting access to medical records about a specific illness in conjunction with certain Identity Elements like sex, age, geographic area while ensuring PII like name, address and phone number are not exposed. For another entity to gain access to either the GUID Identify Elements or Payload, the User may configure Rules and Permissions on what may be accessed. Depending on the entity, the User may require additional levels of assurance by other means as described herein. In addition, the User may configure rules and permissions to control access to shared workspaces (like WeWorks, Plug and Play) or shared workplaces (like film editing, sound engineering, lab space, etc.). The User can digitally provide access to shared cars like ZipCar for certain hours on certain days or fleets used for delivery like Amazon, long haul fleets for freight or shared auto pools for police, companies, military, etc.

The present invention is generally directed to a method for providing one or more secure transactions on behalf of the User requiring the User's GUID in combination with an algorithm or cryptogram to enable the User to present credentials to gain access to hard assets or soft assets. The level of assurance of the GUID will increase based on the algorithm and/or other forms of stepped up authentication like two-factor authentication, biometrics or other combinations of data known only to the User. This Use Case will enable the User to communicate an Identity Element or Payload at an attended or unattended reader depending on the use case. This example would occur when a User is given access to a workplace or restaurant by establishing the User has either had a vaccine or has an antibody so as to allow the User access to public places.

Accordingly, it is a primary object of the present invention to provide a method for authenticating an individual and a cryptogram and a digital device ID for use to gain access to a hard or soft asset.

This and further objects and advantages will be apparent to those skilled in the art in connection with the detailed description of the preferred embodiment set forth below.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a high-level system flow block diagram for establishing the Identity and Authorization Platform used in accordance with the present invention.

FIG. **2** is a flow diagram of communications between a Point of Interaction and a Digital Device which lead up to a An Access Request according to the present invention.

FIGS. **3-5** illustrate steps taken according to the present invention when, respectively, a Digital Device is not already provisioned with a necessary credential to gain access to a resource at a Point of Interaction, and when such access is sought offline or online.

FIGS. **6-10** describe online and offline data flows between an Identity Management Platform, a Digital Device, and a Point of Interaction, in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

In the event access control requires authentication of the individual, it is imperative that the access control device provide several elements:

1. Assurance the individual using the device(s) is the authentic intended user;
2. Assurance that the genuine device is used to gain access; and
3. Assurance any data used to gain access is authentic (is not spoofed) and remains valid for the user for the intended period (and possibly use).

It is also imperative that access control can be customized to accommodate different use cases which may require different levels of assurances.

The present invention focuses on these required assurances to protect access control whether it is a physical location or access to data; contemplates usage in attended access points and unattended access points; and addresses the sensitivity to each of these assurances to ensure they are both reliable and valid.

As the world converts from the information age to the digital age, there is a mounting need to provide a comprehensive, integrated, complete solution of all of these assurances for many forms of access control including, but not limited to, access control on physical campuses (whether it is a military base or private enterprise and many others). Equally, if not more important, is access control that protects the privacy of PII associated with health records, company records, financial matters, and other digital assets. These assurances preclude the growing concerns in the midst of ever-increasing attacks by hackers who do it for the fun of penetrating highly sensitive areas or records. Equally concerning are the pursuits of nefarious hackers who hijack many types of digital assets and hold companies or governments hostage until they pay ransom.

Many existing security protocols have been created to provide adequate solutions addressing one or two of these assurances. Despite the efforts of some of the greatest minds and most successful companies in the world, there are no solutions that deliver on all elements of the assurances of the genuine Intended User while securitizing the IE and the Payload data. Hackers and fraudsters continue to identify the weakest link and continue to find ways to compromise access control solutions. There are many reasons for the failures the hackers have exploited. Some are related to social engineering, defeating these security systems. Some of the obvious reasons are absence of comprehensive and layered security where the system can be compromised. Oftentimes, failure to ensure ease of use and non-disruptive operations slows adoption and usage or encourages users to shortcut their own systems. Both public operations and private enterprise have been slow to keep up with the digital transformation and change or embrace new technology and/or procedures. As a result, many efforts, including several potentially promising efforts, have met with failure.

As digital transformation proliferates across every industry, there is mounting concern about the digital transformation. The media has highlighted cases of companies' data being held for ransom and other means of extracting value from digital data. Accordingly, there is a very real, urgent need to provide the three assurances. These three assurances must be provided in a flexible platform that can be adapted for many different applications.

The present invention seeks to provide new methods for meeting the three required assurances:

1. Assuring the intended user is authentic and some or all of the IE can be securely stored and accessed as needed. Relying on Know Your Customer (KYC) procedures and processes, the present invention can be used for access control authenticating individuals for company identification, personal Electronic Health Records (EHR) access, automobile keys, hotel room keys, and the like;
2. Assuring the genuine digital device(s), whether a mobile phone, Internet of Things (IoT) device, smart watch, or other digital device, is used to gain access; and
3. Assuring the data used to gain access is authentic (is not spoofed) and remains valid for the user for the intended period.

A high-level system flow block diagram of the broad system processes of the present invention is set forth in FIG. **1**. An ID & Authorization Management Platform (System Platform) communicates with an Identity Management Source (GUID Verification Source) and Data Management Sources and provides a Provisioning Application for each Digital Device. ID & Authorization Management Platform also goes through an Authentication Process for each Digital Device through use of the Provisioning Application.

GUID Verification Source **200** authenticates an Intended User is in fact the Genuine User with System Platform **100** and System Platform **100** creates a Genuine User Identification (GUID) for the Intended User while establishing ID Elements associated with the GUID and rules for their use. System Platform **100** also establishes one or more Payloads, which may be obtained from one or more Data Management Sources **300**. System Platform **100** also provisions a specific Digital Device **500** with a digital ID (DID) with a Provisioning Application and seeds an algorithm and/or cryptogram used by the Provisioning Application. Once a Digital Device **500** has been provisioned with a Provisioning Application, System Platform **100** performs an authentication process which allows release of one or more Payloads to said Digital Device **500** while enforcing any rules on delivery of said Payload(s).

It is especially preferred that Digital Device **500** be a communication device having a user interface, short proximity electromagnetic communication device and mobile network interface for connection to at least one mobile network operator, all of which are described in greater detail in U.S. Pat. No. 10,496,832, the disclosure of which is specifically incorporated herein by reference in its entirety.

It is also especially preferred that System Platform **100**, GUID Verification Source **200** and Data Management Sources **300** have a server operably communicating with one or more client devices. The server for System Platform **100** is also in operable communication with GUID Verification Source **200**, Data Management Sources **300**, and one or more Digital Devices **500**, as well as Points of Interaction (defined later herein). Such servers may comprise one or more general-purpose computers that implement the procedures and functions needed to run a system back office in serial or in parallel on the same computer or across a local or wide area network distributed on a plurality of computers and may even be located "in the cloud," and any such server is operably associated with mass memory that stores program code and data, all of which is described in greater detail in in U.S. Pat. No. 10,496,832, the disclosure of which is specifically incorporated herein by reference in its entirety

In accordance with the present invention, there is an initial registration process for an intended user and a provisioning process for a Digital Device to be used by the intended user. The initial registration process establishes the Intended User is really who they say they are and binds the intended user to a GUID and a Digital Device. During this process, the following steps will take place:

Know Your Customer (KYC) Process—this is how an entity will validate the intended user as part of Identity Management or Identity and Access Management ("IdM"). There are various ways to accomplish this and the way which is chosen can be dependent on the necessary assurance level of identity and the entity requirements. Selection of a particular IdM is not critical to the present invention and a person of ordinary skill in the art will recognize that System Platform **100** can plug into an existing IdM or use future IdM as it becomes available.

Account Creation—This creates a user profile for the Intended User in System Platform **100** and establishes a setup of fixed variables and authentication variables. The profile will have:

Authentication Variables—items used to authenticate the account/profile (e.g., login credential)

Fixed Variables—items that do not change over time (e.g., a user ID, birthdate, social security number)

Dynamic Variables—variables which change over time (e.g., temperature, blood pressure, glucose level in blood, immunity, or immunization, etc.)

Mapping Variables—mapping multiple elements of the GUID for the intended user. The processing engine can take into account the context of the presentation (ID, by location, reader ID, etc.,) and based on that information authorize use of the mapping variable. This will map to a loyalty card, payment card, access token, etc.

The profile will also, preferably, have a counter for use in cryptographic functions, such as creating an algorithm to protect sensitive data such as certain Identity Elements (which may reveal the identity of the Intended User) and/or Payload data.

Device Registration—Binding device/application ID information to the intended user account—this is used for risk profiling and cryptogram generation and mapping. During this step, a DID from Digital Device **500** is received in System Platform **100** and, if desired, Digital Device **500** may be assigned its own Digital Tracking ID within System Platform **100**.

Cryptogram Mapping—Generating a Cryptogram within System Platform **100** that is bound to the intended user profile and unique based on device/app. This helps with authentication assurance and loss of device

Entitlements—This step within System Platform **100** is the process of granting a profile access to a resource

Digital Issuance of Cryptogram (Provisioning)—securely Provision and store cryptogram to a Provisioning Application within System Platform **100** which is then securely stored on a Digital Device **500** via a Software Development Kit or Application Programming Interface. During this step System Platform **100** generates the cryptogram and the keys necessary to authenticate which is unique per an individual Digital Device **500**. The cryptogram can be configured to be time based and limited to x number of uses before a replenish is needed and/or can be set so it is only valid for certain times of day or geo locations (this requires geo location on the reader used during an Access Request (discussed later) and not necessarily on the Digital Device **500** presenting the credential).

This step can also include:

Replenish/update of crypto

Update of personalization (Perso) file

Generation of dynamic Perso file—field level encryption on portion of Perso file. These are used to authorize basic access

The Provisioning Application is setup on a Digital Device **500** by establishing a secure trusted communication channel and then loading a Software Development Kit or Application Programming Interface into memory of the Digital Device, the details of which would be known to a person of ordinary skill in the art.

Once an Intended User has a GUID and a Digital Device **500** which has been Provisioned with a Provisioning Application, the Intended User is now in a position to begin an Access Request Process which begins when the Intended User uses Digital Device **500** to present credentials to a Point of Interaction (POI). The credentials can be passed over any accepted communication protocol. What is important is the payload that comes across. The payload can have a User Interface ("UI") to allow the Intended User to add some context of what the intended user wants leveraging discretionary options, e.g., use points, loyalty card, etc. A Point of Interaction is an access point where Digital Device **500** can be read, and local authentication and authorization can take place. Some illustrative examples of local authentication and authorization include using Offline Authentication and Authorization and passing information received from Digital Device **500** to a network to perform authentication.

An Access Request to a venue, services, place, or assets (hard and soft assets) can be considered as falling into three major categories: No authentication or authorization needed for access, unattended access authentication and attended access authorization.

The first major Access Request category of no authentication or authorization need for access can be used to provide access to areas or places where no authentication is needed, e.g., a low-risk building or low-public-density public parks or open spaces. For such locations, no authentication may be needed, but there may just be a need to sign in for use. In such a location, all that is needed to know is that somebody walked in and the same person walked out—maybe used to keep a count of how many people are allowed to be in area, possibly for fire regulations and safety, and to know if anybody is still there or whether everybody who entered is accounted for, which can be especially useful for emergency evacuation purposes, such as in a fire or active shooter scenario. Such access might also be used to limit people time to events, e.g., you have 30 minutes to walk around as time approaches system can send an auto reminder—this can be used for parking meters or any time-based reminders. It can also be used to tie multimodes of transportation, e.g., park car at train lot, ride train, come back and get charged for both parking space and train. (The Intended User would need to tap in tap out and tap along the train rides.) It can also be used to tap in and tap out for payments (double tap) or be used to register a user. It might also be used for more low value, high volume types of access, e.g., cardio readings. In connection with this category, the geographical location of such sign in can be recorded locally on the user's digital device. Such stored access might help users understand if they have been exposed to a contagion at a specified geographical location at a specified time; in business settings, it can be used for security check-ins or delivery check-ins.

For the second two categories, both could be attended or not attended. What is important is whether there is a need for higher level of assurance. It should be a combination of both and then in both instances it could be private or PII could be revealed.

All of these Use Cases have a higher level of security with an Algorithm.

	Private	PII known
Simple Assurance for GUID	Attended or Non-attended	Attended or Non-attended
Higher level of Assurance	Attended or Non-attended	Attended or Non-attended

The second major Access Request category of unattended access authorization relies upon a session of the access credential—a cryptogram—which is enough to Authenticate the Intended User is who they say they are, and an encrypted payload is passed with a Boolean or non-personally identifiable data element response or with information from which personal information of the user can be identified. For example, once the credential is authenticated, authorization (access to a store) is in the encrypted response, yes, the user has immunity to COVID-19. In this type of scenario, the access credential authentication and authorization can be conducted at the Point of Interaction terminal which would allow for millisecond access. The benefit of this Access Request is a human does not need to be involved in verification or the user trying to gain access—this allows for rapid access while ensuring only a qualified user (authenticated and authorized) can gain access to the facility. This is to allow access to a place where you don't need to know any personal info about a user, an example of which is that you just need to know if the user can enter (e.g., is at least 21 years old or has immunity of COVID-19). After the user satisfies one or more predefined criteria, the user is allowed access during a predefined time period. A token and crypto is used to authenticate that the criteria passed belongs to the intended user and the intended user is who they say they are. User validation is based on KYC done during registration. This category of Access Request can be thought of as an extension of no authentication needed, all the use cases in that area can apply here. E.g., this can be used for low or medium value high volume access, Mobility as a Service, etc.

The third major Access Request category of attended access authorization requires a higher level of assurance then just passing a cryptogram and will require, for example photo ID or response to some personal questions. Within this Access Request category information about the identity of the user can be kept private or portions of such information can be revealed. The cryptogram will still be used to authenticate the User anonymously, but in addition to the anonymous authentication it will be used to retrieve an additional pre-authenticated data element such as photo or passphrase. This information will be retrieved from the KYC owner and only presented with the user's Crypto to a 3rd party verifier such as a human-gate-attendant or Facial Biometric gate apparatus (such as airport border security face scanner/gate). This category of Access Request can be thought of as an extension of the unattended access, but here the intended user needs a high level of assurance to validate who they are. The additional factor used to authenticate the user will come from the KYC setup and the user will NOT provide this. In this particular category of Access Request, security is more important than speed, and it can be used for more high value, low volume access.

A Digital Device used to make an Access Request can have a screen, such as a mobile phone, laptop, tablet or watch, phone, or a device without a display (e.g., ring, key fob, card, tag) which can be paired with a smart device to pass the credential over to the Point of Interaction. In some cases, where information transmitted from the Digital

Device is simple, such as a binary yes/no answer, or a simple data point (e.g., age, authorization level, timed access window, and the like), the information can be transmitted from the Digital Device by simply tapping the smart device to gain access. When multifactor identification is used, it can be made as frictionless as possible by a Digital Device which presents the credential only after the Digital Device has been unlocked (something they know or are) by the owner (biometric or passcode) and then the token and cryptogram (something they have) can get passed to the reader Authentication of crypto and token combo necessary to validate.

Communications between a Point of Interaction and a Digital Device which lead up to a An Access Request are illustrated in FIG. **2**. FIG. **3** illustrates the steps which take place if the Digital Device does not have a credential for an asset for which access entry is sought. When the Digital Device does have a credential for accessing an asset (through a prior provisioning operation), access is sought either through an offline process (illustrated in FIG. **4**) or through an online process (illustrated in FIG. **5**).

The present invention will now be described in further detail by referencing the scenario of an Intender User who is seeking access to a physical (or hard asset), rather than a soft asset, through a Point of Interaction; in this scenario, access to a hard asset is controlled by a physical switch. In this illustrative (but not limiting) scenario, a physical switch can be a smart switch (having its own electronic processor and controls, along with its own executable software or code) or any physical device, mechanism or means used to grant access to the asset. For example, if entry through a door is desired, the physical switch may control one or more locks. In another example, the physical switch may be a lock to a box or container which itself contains something which controls access—for example, the physical switch may control access to a lock box in which a set of keys is stored, and then the keys can be used to turn on a lock, such as that of a car or other piece of machinery, and such keys might be smart keys or simply plain old metal keys. In another example, the physical switch might control access to a physical token which itself can then be used to gain access to the asset (such as through a subway turnstile) or to a digital token, such as a bar code or QR code, which can be used to gain access, In yet another example, the physical switch might control a delivery mechanism for providing the physical or hard asset to the User (in much the same way a vending machine delivers items when the appropriate sum has been paid for such delivery), and the Point of Interaction can provide traceability and security for delivery of sensitive assets, illustrative examples of which include restricted items such as drugs and alcohol and high value items, such as items purchases online which are being picked up from a pickup location. Because cell phones are more or less ubiquitous at the present time, and most smart cell phones have NFC capability, it will be useful to further describe the invention by reference to the non-limiting case of a mobile smart phone (which may have either an Android or iOS operating system) which uses NFC. Also, as will be described in greater detail below, it is worth noting that either an Android or iOS operating system will work the same way with NFC and the protocol hereinafter set forth.

In an especially preferred (but non-limiting) embodiment, NFC communications between a Digital Device and a Point of Interaction are facilitated by setting the Point of Interaction to emulate an ISO 14443 tag with a configured payload identifiable by standard readers. A standard reader is an NFC enabled reader that conforms to the ISO protocols necessary to read an ISO 14443 tag. (An ISO 14443 tag is described in ISO/IEC 14443, the contents of which is specifically incorporated herein by reference in its entirety.) The Point of Interaction waits for an NFC field trigger indicating a nearby reader. Once triggered, the Point of Interaction emulates the ISO 14443 tag payload.

A Digital Device which generated the field reads the ISO 14443 payload and determines whether there is an application registered to handle the payload. In the case where no such application is registered, the default Digital Device behavior continues which might include navigation to a mobile site associated with the asset being protected by Point of Interaction. In the case where an application is registered with the payload, the Digital Device would have had the application installed and configured which includes setting an international Application Identifier (AID) of interest and configuring the Digital Device to scan for ISO 14443 payloads and associate with the application. When the application is activated by Digital Device **500**, Digital Device **500** performs a Select on a specific international AID. Point of Interaction responds with a proprietary File Control Information (FCI) template. Application requests detailed data from the Point of Interaction which responds with a Point of Interaction ID, Security Realm ID and an unpredictable number ("nonce"). Application creates an Access Request payload using the algorithm described and submits to the Point of Interaction.

There may be times and applications where a Digital Device cannot or does not communicate through a Point of Interaction with System Platform **100**, such as a remote location where there is no reliable network connectivity, or applications in high throughput areas that only need a low level of assurance that a user/account is valid; in such situations, an Offline Data Authentication reader can interact with Digital Device **500** to authenticate that a user account and the Digital Device are valid. A cache of information needed to authenticate Digital Device **500** can be preloaded to Offline Data Authentication reader while Digital Device **500** can be preloaded with specific data. Communication between Offline Data Authentication reader and Digital Device **500** can be over NFC, RFID, BLE, Bluetooth, or the like, and is done based on the pre-loaded data by creating a type of mutual Secure Sockets Layer, where Offline Data Authentication reader has portion of the certification and Digital Device **500** has another portion of the certification. Once communication is established, a payload passed by Digital Device **500** has a crypto to authenticate the user through use of a cryptogram vault in Offline Data Authentication reader while a cryptographic hash function can be used for mutual authentication.

The Algorithm is used in Digital Device **500** to generate an Access Request cryptogram and in Identity & Authorization Management Platform **100** to validate the Access Request. An example of an especially preferred algorithm, which is not meant to be limiting, but is meant solely to be illustrative, is based on ISO/IEC 9797-1 MAC algorithm 3 set forth in ISO/IEC 9797-1, the disclosure of which is specifically incorporated herein by reference in its entirety. The keys K and K1 are the most significant 8-bytes and least significate 8 bytes of the Limited Use Key. The Limited Use Key is shared between Digital Device **500** and Identity & Authorization Management Platform **100** during setup and updated after a configured number of uses of the LUK have transpired. This key is generated by Identity & Authorization Management Platform **100** which is specific to each digital device. The input to the algorithm is a combination of data values originating from Digital Device **500** and the Point of Interaction. The Digital Device provides a Transaction

Counter and the GUID. The Point of Interaction provides its Point of Interaction ID, the Security Realm ID, and a 4-byte nonce.

In typical online operational mode for an access authorization transaction, Point of Interaction validates required data of an access request payload and upon identifying no issues, submits the access request payload to Identity & Authorization Management Platform. Identity & Authorization Management Platform inspects Payload to identify the configuration data associated with the GUID and the Digital Device previously registered with the Identity & Authorization Management Platform and the keys shared with the device. The access request cryptogram is validated against data known for this GUID and Digital Device. The Transaction Counter provided in the payload is verified against the Identity & Authorization Management Platform's tracked Transaction Counter for this Digital Device. The GUID is replaced with the previously established User mapped to the GUID.

Additional details about the invention will now be provided by setting forth a non-limiting description of online and offline access flows illustrated in FIGS. **6-10** which take place involving an Identity & Authorization Management Platform (IDAMP), a Digital Device (Device), a Point of Interaction (POI) (which is protecting a hard asset) and a designated Certificate Authority (CA).

Initial State.

Before a specific Access Request is generated, IDAMP securely creates a public/private keypair for every Realm it is managing. A Realm is a logical construct defining a set of Points of Interactions (POIs). A POI can be configured to only one Realm. A Point of Interaction Identifier (POIID) is unique to a Realm. The keypair is used with the Realm and other data specific to the IDAMP to create a Public Key Certificate and is signed by a designated Certificate Authority (see FIG. **6**). This IDAMP Certificate is sharable with all POI configured to protect an asset of the Realm stated on the IDAMP Certificate.

A Digital Device is provisioned with a mobile device application configured to use this IDAMP. The Digital Device has been enrolled with IDAMP and has established trust between it and the IDAMP. (Steps necessary to do this have already been described and are not described in this data flow description.)

Provisioning Request.

The Digital Device wants request access to one or more assets in this Realm. The Digital Device uses its internal Keystore mechanism, widely available on all digital mobile devices, to generate a public/private keypair. The public component of the keypair (Device Public Key) is sent to IDAMP along with the other required components of an access request.

Creating the Digital Data Record (Payload).

If IDAMP grants access to the assets of the realm to the user of the device, it creates a Digital Data Record (Payload) for this user on this device for this realm consisting of the following components:

Payload

	Name	Type
Signed Data	RealmID	entity
	GUID	entity
	AccessGroupsList	array
	AccessablePOIsList	array
	EffectiveDateTime	entity
	ExpirationDateTime	entity
	TrustedPrimaryData	array
	TrustedDiscretionaryData	array
	DevicePublicKey	entity
Data	TrustedPayloadSignature	entity
	UntrustedPrimaryData	array
	UntrustedDiscretionaryData	array

The data elements RealmID, GUID, AccessGroupsList, AccessablePOIsList, EffectiveDateTime, ExpirationDateTime, TrustedPrimaryData, TrustedDiscrectionaryData and DevicePublicKey as combined are signed by the IDAMP with the IDAMP private key for this realm. The signature is then added as unsigned data

Description of items:

RealmID—the known unique identifier for this realm.

GUID—the tokenized representation of the user

AccessGroupsList—a list of "groups of POIs" specific to this realm which this user is allowed to access

AccessablePOIsList—a list of specific POIs this specific user is allowed to access

EffectiveDateTime—the exact time and date this Payload is considered active

ExpirationDateTime—the exact time and date this Payload is no longer active

TrustedPrimaryData—a list of tuples the 'keys' known and preconfigured

TrustedDiscretionaryData—a list of tuples with configurable keys

TrustedPayloadSignature—the signature of the combined above data items signed

UntrustedPrimaryData—a list of tuples with 'keys' preconfigured. Not part of signature.

UntrustedDiscretionaryData—a list of tuples with configurable keys. Not part of signature.

TrustedPrimaryData, TrustedDiscretionaryData, UntrustedPrimaryData and UntrustedDiscretionary data all share the same format. Date of Birth (DOB) is an example of a known key/value pair that is established by the IDAMP and trustable if supplied.

Trusted Primary Data Objects

Name	Description
DOB	Date of Birth
TP1	1st Trusted Object
TP2	2nd Trusted Object
. . .	
TPN	N'th Trusted Object

The IDAMP sends the Payload to the Digital Device. Digital Device stores the Payload, but secure storage is not a requirement.

Common to Online and Offline Transactions.

The Mobile App does a Select to start transaction. The POI returns:

Its RealmID

Its POIID (sometimes called a resourceID—it's the unique identifier the POI is configured to have

A nonce (random number—8 bytes currently)

The mobile app looks in its list of Payloads it has and tries to find one that matches this POI's RealmID. It finds it and can now create an Access Request Cryptogram. It builds this using both the data that the POI gave it as well as the Payload for this Realm. The 3 data items from the POI along with a Transaction Counter the Digital Device maintains are combined and the data is signed by the mobile application using the private key it generated previously for this realm. The resulting signature is added to the Transaction. The device also appends the combined signed fields on the Payload for this Realm as well as the IDAMP generated signature. The unsigned data in the UntrustedPrimaryData and UntrustedDiscretionaryData fields are not included. An Access Request Cryptogram sent from the Digital Device to the POI has the following elements.

Access Request Cryptogram

	Name	Source
Device Signed Data	RealmID	POI
	POIID	POI
	nonce	POI
	TranscactionCounter	Device
	Device Payload Signature	Device
IDAMP Signed Data	RealmID	IDAMP
	GUID	IDAMP
	AccessGroupsList	IDAMP
	AccessablePOIsList	IDAMP
	EffectiveDateTime	IDAMP
	ExpirationDateTime	IDAMP
	TrustedPrimaryData	IDAMP
	TrustedDiscretionaryData	IDAMP
	DevicePublicKey	IDAMP
	IDAMP PayloadSignature	IDAMP

The POI receives this Access Request Cryptogram.

Online Transaction Flow.

The POI determines based on configuration to do an Online Access Request Transaction. It simply submits this entire Transaction Request to its preconfigured IDAMP.

IDAMP retrieves the Device Public Key and Transaction Counter and acceptable Transaction Counter Range it has stored for this GUID/Realm combination. Using this key, it validates the Device Payload Signature. If this signature is correct ('checks out') the IDAMP can be assured the Device with this private key generated the Device Payload Signature.

IDAMP next validates the IDAMP signed data using the IDAMP PayloadSignature. If this signature is correct, the IDAMP can be assured these data fields are the same as it built when the Payload was issued to the device. Next it verifies that the DevicePublicKey matches the public key it retrieved for this device, that the RealmID matches the Device Signed RealmID and verifies Payload is active based on the current time and date between the effective and expiration dates. Finally, the IDAMP checks that the sent Transaction Counter against its stored Transaction Counter value does not differ from the stored Transaction Counter value more that the acceptable Transaction Counter Range. If these all are correct, IDAMP next detokenizes the GUID to retrieve the actual User behind the GUID.

Next the platform checks in its configuration that the following are all true:

The User is registered on this Realm

The User has been granted access to this specific POIID

[Here there would be other options like doing step-up, etc.]

IDAMP generates and sends an authorization ID and an authorization status (allowed/denied) to the POI. POI reads this response and activates the mechanical switch based on the status.

Offline Transaction Flow.

The POI also is able to do an Offline Access Request Transaction. This is useful when:

Cheaper hardware is sourced without network capability

No network exists in the POI's location

Network capability and network exist but the network is not available

When the POI retrieves the Transaction Payload from the Mobile Device and determines to do an Offline Access Request Transaction, it uses its provisioned IDAMP Certificates public key to verify the IDAMP Signed Data has not been altered. Once verified, the now trusted Device Public Key (part of the IDAMP Signed Data) is extracted and used to verify the Device Signed Data just created by the Mobile App. If this also is correct, the nonce is compared to the nonce just sent to the Mobile Device. If this the known nonce matches the sent nonce, the POI is assured that the device has the private key part of the keypair given to the IDAMP when the Payload was generated. It also knows that this is not a 'replay' since the nonce signed and returned matches the just generated nonce.

The POI then compares the RealmID to its configured RealmID it is protecting. These should and must match. Next it compares its configured allowable Access Group members settings against the list of AccessGroupsList from the IDAMP Signed Data. It also compares its POIID against the AccessablePOIsList. Finally, it compares that its known date and time fall between the EffectiveDateTime and the ExpirationDateTime, thus determining if the Payload is active.

The POI will allow access only if the following are all true:

The RealmID for the Payload matches the RealmID it is protecting

Either of the following:

The Payload is provisioned with a Group matching one of the Groups this POI allows, OR

The Payload is provisioned with a POIID matching the POIID of this POI

The known POI date/time is greater than the EffectiveDateTime

The known POI date/time is less than the ExpirationDateTime

The details of this access are stored in the POI for logging and analysis purposes later.

The foregoing description lends itself to a number of methods, some of which include in the following identified methods. These methods are not meant to be limiting; rather, they are merely illustrative, and a person of ordinary skill in the art will recognize that additional methods, not enumerated below, also fall within the scope of what has already been disclosed. The first set of methods are all performed on the Identity & Authorization Management Platform which is operated by at least one hardware processor and has a network connection, such as the Internet.

Method 1. A method for authentication and authorization of an Intended User of a digital device, implemented through use of an Identity & Authorization Management Platform operated by at least one hardware processor, comprising the steps of:

establishing a Genuine User ID ("GUID") for the Intended User based upon input received from an Identify Management Source, wherein the GUID is generated from a plurality of Identity Elements associated with the Intended User according to a GUID set of rules which establishes how many of the plurality of Identity Elements of the Intended User will be associated with the GUID for a preselected digital access use by the Intended User;

establishing at least one Payload from at least one genuine Digital Data Record associated with the Intended User for the preselected digital access use by the Intended User;

configuring an algorithm for use by the Intended User;

receiving a Device Identification from the digital device intended for use by the Intended User;

validating that the Intended User of the digital device is authorized to access the at least one Payload through use of the algorithm and the GUID; and

provisioning the digital device with an access control application configured to authorize the preselected digital access use by the Intended User to access said at least one Payload.

Method 2. In addition to the method set forth in Method 1, the further steps of:

creating a user profile for the intended user, wherein the user profile is comprised of:

a plurality of authentication variables configured for use to authenticate a user account or the user profile;

a plurality of fixed variables which do not change over time;

a plurality of dynamic variables which change over time; and

a plurality of mapping variables.

Method 3. The method set forth in Methods 1 or 2 wherein the user profile also includes a counter.

Method 4. The method set forth in Method 3 wherein the plurality of dynamic variables includes at least one secret.

Method 5. The method set forth in Method 4, wherein said at least one secret is known by the Intended User.

Method 6. The method set forth in Method 5 with the additional step of generating said at least one secret.

Method 7. The method set forth in Method 3 with the additional step of registering the digital device to the user profile.

Method 8. The method set forth in Method 3 with the additional step of linking the digital device to the GUID.

Method 9. The method set forth in either Method 7 or in Method 8 with the additional step of creating an algorithm to protect sensitive data and which is unique based upon input and associated with the user profile and the digital device.

Method 10. The method set forth in Method 9, wherein the sensitive data includes at least one Identity Element.

Method 11. The method set forth in Method 9, wherein the sensitive data includes at least one Payload.

Method 12. The method set forth in Method 11, with the further step of securely provisioning the digital device with output of the algorithm and associated with the GUID when provisioning the digital device with the access control application.

Method 13. The method set forth in Method 12, wherein the access control application is configured to allow an Access Request originating within the digital device to provide a Payload to an access point without needing authorization from the Identity & Authorization Management Platform.

Method 14. The method set forth in Method 13, wherein the Payload includes one of the plurality of Identity Elements associated with the Intended User.

Method 15. The method set forth in Method 14, wherein the Payload does not include a data element which can personally identify the Intended User.

Method 16. The method set forth in Method 13, wherein the Payload includes a pre-authenticated data element associated with the Intended User.

Method 17. The method set forth in Method 13, wherein the Payload includes a response to a Boolean query.

Method 18. The method set forth in Method 13, wherein the access control application is configured to record geographical information related to the access point.

Method 19. The method set forth in Method 13, wherein the access control application is configured to track time information related to the access point.

Method 20. The method set forth in Method 12, with the further steps of:

receiving an Access Request from a point of interaction, wherein the Access Request originates with the provisioning application stored in the digital device;

authenticating the Access Request; and

providing a Payload to the provisioning application.

Method 21. The method set forth in Method 20, wherein the Payload includes one of the plurality of Identity Elements associated with the Intended User.

Method 22. The method set forth in Method 21, wherein the Payload does not include a data element which can personally identify the Intended User.

Method 23. The method set forth in Method 20, wherein the Payload includes a pre-authenticated data element associated with the Intended User.

Method 24. The method set forth in Method 20 wherein the Payload comprises a response to a Boolean query.

Method 25. The method set forth in Method 20, wherein the Access Request is validated by use of the GUID and the output of the algorithm in response to the Access Request.

Method 26. The method set forth in Method 20, wherein authenticating the Access Request requires a communication between the access point and the Identity & Authorization Management Platform.

Method 27. The method set forth in Method 26, wherein the communication is an unattended communication from the access point.

Method 28. The method set forth in Method 26, wherein an entity Element is transferred from the Identity & Authorization Management Platform to the access point in the communication for use in authenticating the Access Request at the access point by an attendant at the access point.

Method 29. The method set forth in Method 28, wherein the attendant is comprised of an electronic biometric device.

Method 30. The method set forth in Method 26, wherein the communication provides the Payload to the provisioning application.

Method 31. The method set forth in Method 30, wherein the Payload includes sensitive information which is encrypted.

Method 32. The method set forth in Method 30, wherein the Payload includes sensitive information which is encrypted.

Method 33. The method set forth in Method 20, wherein authenticating the Access Request requires accessing a cache of information stored in an offline Data Authentication reader.

Method 34. The method set forth in Method 1, with addition of the following steps:

receiving a second Device Identification from a second digital device intended for use by the Intended User;

authorizing digital access to said at least one Payload through use of the algorithm, the GUID and the second Device Identification; and provisioning the second digital device with a second access control application configured to authorize the preselected digital access use by the Intended User to access said at least one Payload.

The next set of methods are all performed at the Point of Interaction which is a combination of electronic hardware, a software stack, and the ability to control a physical switch. The physical switch can be a lock (e.g., a door lock, or lock to a box) or some other type of physical device which grants or denies access to a physical asset.

Method 35. A method for authentication and authorization of an Intended User of a resource controlled by a point of interaction ("POI") comprised of electronic hardware, a POI program stored in a POI digital medium and means to control a physical switch, comprising the steps of:

initiating an interaction between the POI and a digital device provisioned with a program stored in a first digital medium configured for use with the POI;

sending, from the POI to the digital device, a response which includes a known application identifier and a request for a credential needed to access the resource;

receiving, at the POI from the digital device, an access transaction request comprised of a transaction cryptogram from which the credential can be authenticated;

at the POI, either initiating a service request for processing over a network connection or initiating an offline authentication to determine whether or not the physical switch should be activated to allow the Intended User access to the resource, wherein

if a service request for processing is initiated over the network connection, the service request is sent over the network connection to a network Identity & Authorization Management Platform, operated by at least one hardware processor, to validate that the Intender User is authorized to access the Resource by the digital device; and

receiving, at the point of interaction from the network Identity & Authorization Management Platform, an authorization response; or

if an offline data authentication is initiated, and the POI has an offline capability via an offline Identity & Authorization Management Platform, validating whether the Intender User is authorized to access the Resource by the digital device.

Method 36. The method set forth in Method 35, wherein the interaction is initiated by the steps of:

tapping the digital device to the POI;

sensing, at the POI, the digital device; and

emitting, at the POI, a near field communication ("NFC") in a NFC data exchange format which includes a Uniform Resource Identifier.

Claim 37. The method set forth in Method 35, wherein the interaction is initiated by the steps of:

waiting, at the POI, for a near field communication ("NFC") field trigger indicating a nearby reader;

receiving the NFC field trigger from the digital device;

at the POI, emulating an ISO 14443 tag with a configured payload identifiable by a standard reader.

Method 38. The method set forth in any of Methods 35-38, wherein the POI operates only online, only offline, operates offline when online is unavailable, or when it chooses to operate offline during preselected time periods.

It will be appreciated by persons skilled in the art that the aforementioned methods do not set forth every aspect of the present invention, nor do they recite steps performed by a User; instead, they are meant solely to be illustrative and helpful in illustrating some of the methods disclosed herein.

Although the foregoing detailed description is illustrative of preferred embodiments of the present invention, it is to be understood that additional embodiments thereof will be obvious to those skilled in the art. For example, because of the level of trust that can be verified in accordance the foregoing methods, in which the Intended User can be trusted to be the Genuine User, the Digital Device is trusted to be the specific device it purports to be, and the Payload which is conveyed is trusted to not be altered, a POI (even an unattended POI) can grant access to assets which require one or more specific Identity Elements to be met. In this regard, and merely for purposes of illustration, a POI could be configured to allow delivery of alcohol or prescription drugs, for example, in a vending machine or lockbox type of device, because qualifying Identity Elements can be used and trusted. Further modifications are also possible in alternative embodiments without departing from the inventive concept.

Accordingly, it will be readily apparent to those skilled in the art that still further changes and modifications in the actual concepts described herein can readily be made without departing from the spirit and scope of the disclosed invention.

What is claimed is:

1. A process for authentication and authorization of an Intended User to access a hard asset controlled by a point of interaction ("POI"), wherein the POI is comprised of electronic hardware, a POI program stored in a POI digital medium and means to control a physical switch which allows access to the hard asset, comprising the steps of:

initiating an interaction between the POI and a mobile digital device provisioned with a program stored in a first digital medium configured for use with the POI;

sending, from the POI to the mobile digital device, a response which is comprised of a first realm identifier, a POI identifier and a request for a credential needed to access the hard asset;

receiving, at the POI from the mobile digital device, an access transaction request which is comprised of a transaction cryptogram from which the credential can be authenticated, wherein the credential is comprised of a first set of elements signed by a private key of the mobile digital device previously generated for a first realm, including at least a first element sent by the POI to the mobile digital device in the response and a second element sent by an Identity and Authorization Management Platform ("IDAMP"), operated by at least one hardware processor, to the mobile digital device in a payload; a second set of elements signed by a private key of the IDAMP; and an IDAMP payload signature;

at the POI, either initiating a service request for processing over a network connection or initiating an offline authentication to determine whether or not the physical switch should be activated to allow the Intended User access to the hard asset, wherein

if a service request for processing is initiated over the network connection, the service request is sent over the network connection to the Identity and Authorization Management Platform to validate whether the Intender User is authorized to access the hard asset by the mobile digital device; and

receiving, at the point of interaction from the network Identity and Authorization Management Platform, an authorization response; or

if an offline data authentication is initiated, and the POI has an offline capability via an offline Identity and Authorization Management Platform, validating whether the Intender User is authorized to access the hard asset by the mobile digital device;

wherein validating whether the Intender User is authorized to access the hard asset by the mobile digital device will only result in authorizing access to the hard asset when all of the following are true:

(1) it is verified that the mobile digital device used the private key of the mobile digital device previously generated for the realm to generate a mobile digital device payload signature contained in the first set of elements;

(2) it is verified that the second set of elements has not been altered; and

(3) the Payload contains a second realm identifier which matches the first real identifier.

2. The process of claim **1**, wherein the interaction is initiated by the steps of:

tapping the mobile digital device to the POI;

sensing, at the POI, the mobile digital device; and

emitting, at the POI, a near field communication ("NFC") in a NFC data exchange format which includes a Uniform Resource Identifier.

3. The process of claim **1**, wherein the interaction is initiated by the steps of:

waiting, at the POI, for a near field communication ("NFC") field trigger indicating a nearby reader;

receiving the NFC field trigger from the mobile digital device;

at the POI, emulating an ISO 14443 tag with a configured payload identifiable by a standard reader.

4. The process of claim **3**, wherein the second set of elements includes a Genuine User ID ("GUID") for the Intended User generated from a plurality of Identity Elements associated with the Intended User according to a GUID set of rules which establishes how many of the plurality of Identity Elements of the Intended User will be associated with the GUID to allow the Intended User access to the hard asset.

5. The process of claim **3**, wherein the GUID does not include an Identity Element which can personally identify the Intended User in the offline Identity and Authorization Management Platform.

6. The process of claim **1**, wherein the second set of elements includes a Genuine User ID ("GUID") for the Intended User generated from a plurality of Identity Elements associated with the Intended User according to a GUID set of rules which establishes how many of the plurality of Identity Elements of the Intended User will be associated with the GUID to allow the Intended User access to the hard asset.

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